

**AMENDMENTS TO THE CLAIMS:**

Claims 1-8 (canceled)

Claim 9 (new): A modified radial motion (MRM) method for modifying lengthwise curvature of face-milling spiral bevel and hypoid gears capable of modifying lengthwise curvature of face-milling spiral bevel and hypoid gears by providing modified radial motion of a head cutter and by cooperating with rotation of a cradle without changing the head cutter's geometry;

wherein the modified radial motion of the head cutter and a rotation angle of the cradle are nonlinear functions of a rotation angle of work-gear and a rotation angle of the cradle, a locus of the head center is achieved by a constant radial setting and by modifying a vertical distance  $E_m$  between work-gear-axis  $c-c$  and cradle-axis  $a-a$ , a coefficient of the high-order polynomial formula form of the modified radial motion of the head cutter and the rotation angle of the cradle is determined by amount of correction at an arbitrary position on a tooth face, the head cutter is adjusted along unit normal of tooth surface of the cutter, a new position of the cutter center in machine plane will be correspondingly decided, and new positions of the head cutter center in machine plane will be correspondingly decided after giving amounts of correction at plural positions to be corrected, with the new positions, the coefficient of the high-order polynomial form of the modified radial motion of the head cutter and rotation angle of the cradle will be determined;

whereby during the process of modifying the lengthwise curvature, radial setting of the head cutter will change with the rotation of the cradle, and a rotation center of the head cutter will trace a circular arc in a machine plane if radial setting is constant, so that an adjustability of gear set will be improved without changing the bearing ratio.

Claim 10 (new): The MRM method as claimed in claim 9, wherein the modified radial motion of the head cutter is applied to a hypoid and spiral bevel generator with

and without a tilt head cutter.

Claim ~~10~~<sup>11</sup> (new): The MRM method as claimed in claim 9, wherein the modified radial motion of the head cutter is applied to holding-type-orthogonal CNC hypoid and spiral bevel generators.